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AUTHOR Holvoet, Jennifer F.; And Others
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ABSTRACT

A three-unit contingency record of the types of mands (instructions, commands, directions, and questions) presented, the classes of response evoked, and the consequent conditions for the responses was used in an observational study of "mand interactions" between supervisors and employees of four groups: nonretarded adolescents living and working in the community; moderately and mildly retarded institutionalized adolescents working in the community; and moderately and mildly retarded adolescents living and working in an institution. The results provided some evidence that the majority of mands in vocational settings are in an explicit form requiring an observable response; incorrect responding to mands per se is virtually nonexistent in vocational settings; and consequences of responses to mands are usually unobservable, i.e., neither positive nor negative. Training emphases indicated by the data involved acquisition of verbal repertoires including inquiry skills and conversational skills which may serve as socially acceptable alternatives to immediate compliance with mands. (Author)

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MAND INTERACTERACTIONS IN RETARDED AND NONRETARDED ADOLESCENTS: AN OBSERVATIONAL STUDY IN VOCATIONAL SETTINGS[1]

Jennifer F. Holvoet, Ingo Keilitz, and Dennis J. Tucker

Abstract

A three-unit contingency record of (1) the types of mands presented, (2) the classes of response evoked by those mands, and (3) the consequent conditions for those responses, was used in an observational study of "mand interactions" between employees and supervisors. Four groups were observed: (1) nonretarded adolescents living and working in the community; (2) moderately and mildly retarded adolescents living in the community; (3) moderately and mildly retarded adolescents living in an institution and working in the community; and (4) moderately and mildly retarded adolescents living and working in an institution. The results provided some evidence that (a) the great majority of mands provided in vocational settings in the institution and the community are in an explicit form requiring an observable response, (b) incorrect responding to mands per se is virtually nonexistant in vocational settings, and (c) consequences provided for responses to mands are predominately unobservable, i.e., neither positive nor negative.

It was suggested that remedial procedures aimed at elimination of incorrect motor responses to mands per se may be misdirected efforts. Training emphases indicated by the data were those involving acquisition of verbal repertoires including inquiry skills and conversational skills which may serve as socially acceptable alternatives to immediate compliance with mands.

This paper is concerned with mentally retarded adolescents' responses to instructions, commands, directions, requests, and questions, or what have been collectively termed "mands" (Skinner, 1957; Spradlin, 1963). Such non-speech communication, i.e., motor performances carried out in response to the speech of others, has received far less research emphasis than the production of speech of mentally retarded persons (Keane, 1972; Schiefelbusch, 1963). However, it is likely that non-speech receptive language behavior plays an important role in the communication of the mentally retarded. Moreover, it may be argued that the ability to respond appropriately to the speech of others is even more crucial to the retarded person than to the nonretarded person. With decreased mental abilities, but adequate physical abilities, it may be more adaptive from the standpoint of survial for a retarded person to do what he is asked than to be able to speak with clarity, precision, and flexibility.

Sokolove and Girardeau (1972) questioned developmentally disabled children, their parents, teachers, and employers about what they considered the most important language and communication behaviors that developmentally disabled children must perform frequently in daily living. Their survey revealed that, according to the parents, teachers, employers, and the children themselves, following directions is one of the most frequently encountered and important language behaviors of developmentally disabled children. Similarly, in examining the verbal

interactions between mothers and their nonretarded children, and mothers and their retarded children, Marshall, Hegrenes and Goldstein (1973) found that the only difference between the groups of mothers was a higher rate of manding (i.e., directing, commanding, requesting, and asking) by mothers of retarded children.

While the communication demands placed upon the retarded seem to be more frequently via mands, their responses to such verbal messages are likely to be deficient. Lent, Holvoet, Ferneti, Keilitz and Tucker (in press) found that institutionalized moderately retarded adolescents demonstrated behavioral deficits in direction following when compared to their nonretarded counterparts living in the community. However, behavioral deficits in direction following by the retarded were evident only when directions (e.g., "Give me the red airplane.") were two, three, and four in number; no significant differences between the retarded and nonretarded adolescents' direction following were found in response to single directions or directions exceeding four in number.

On the basis of the foregoing, one can conclude that (1) non-speech aspects of language, such as motor performances carried out in response to mands, play an important role in the communication of the mentally retarded, and (2) the retarded very likely may be deficient in these aspects of language. Unfortunately, from the standpoint of rehabilitative procedures aimed at deficiencies in responses to the language

of others, the issue of what are specific functional target behaviors is unclear. Lent et al., for example, suggest that programs to habilitate direction-following deficiencies be restricted to two and three directions in number, but base their suggestions solely on deficiencies demonstrated in experimental settings and not on established demands for this range of behaviors in the natural environment. A reasonable suggestion may be that training programs aimed at improving appropriate communication of the retarded be developed not only on the basis of demonstrated deficiencies but also on the basis of functional value. That is, it is perhaps best to look at the language in the natural setting or community (cf., Spradlin, 1966).

This study was undertaken to identify and compare the kinds of non-speech responses to mands made by retarded and nonretarded adolescents in vocational settings. Performances carried out in response to mands were studied in the context of the entire verbal episode (Skinner, 1957). That is, observations and data recording procedures included not only the response itself, but also its antecedent stimuli (i.e., the type of mand provided) and its consequent events. The resulting three-unit contingency record of "mand interactions" has the potential for providing a base from which functional non-speech language programs might be developed.

Specifically, this study attempts to answer the following questions: (a) What types of mands are provided to retarded adolescents in natural

vocational settings? (b) Do the types and frequencies of mands differ as a function of the setting, i.e., institution, community, or sheltered workshop? (c) Do the types and frequencies of mands provided nonretarded adolescents differ from those provided retarded adolescents? (d) What kinds and types of responses to mands are made by retarded adolescents? (e) What are the consequences of those responses? (f) If differences between groups, settings, antecedent stimuli, responses, and consequences occur, what is the extent and nature of these differences and what training emphases are suggested by these differences?

METHOD

Subjects and Settings

Four groups of four individuals, aged 15-24 years, served as subjects. The four groups were -- N: nonretarded adolescents living and working in the community; Com-Com: moderately and mildly retarded adolescents living and working in the community; Inst-Com: moderately and mildly retarded adolescents living in an institution and working in the community; and Inst-Inst: moderately and mildly retarded adolescents living and working in an institution. Each of the subjects was observed during interactions with a work supervisor who in all cases was the immediate "superior" of the subject and the person with whom the subject had the greatest frequency of "mand interactions." The four groups and the settings in which they were observed are described below.

The nonretarded group, N, was comprised of one female "blue-collar" worker employed by a local clothing manufacturer, two male "semi-skilled" seasonal employees of a local poultry processing plant, and one female supervisor-trainee at a sheltered workshop. The subject employed at the clothing plant was observed in a large sewing room containing industrial sewing equipment. About 100 other employees worked in the same room. Two subjects were observed in a large work area of the poultry processing plant. This work area contained heavy machinery operated on an assembly line basis. At the time of observation about 40 other employees were present. The fourth subject in this group, the supervisor-trainee, was observed while folding gauze materials at a table located in a large room with ten other employees. No machinery was present in the room at the time of observation.

The second group, Com-Com, were four moderately and mildly retarded (AAMD, 1973) persons living and working in the community. One female subject was a "blue-collar" worker employed by a local clothing manufacturer and observed in the sewing area described above. Two female subjects were observed folding gauze in the same area as described above with reference to the supervisor-trainee in the N group. The fourth subject, a male, was observed in another sheltered workshop, lettering advertising signs at one of six tables in a 40' x 40' room where nine other employees were engaged in similar tasks.

The third group, Inst-Com, were four moderately and mildly retarded persons who resided at Parsons (Kansas) State Hospital and Training Center, but worked in the community in two workshops in the vicinity of the institution. One female and two male subjects, classified as "unskilled laborers," were observed cleaning and sorting fish hooks at a small table in a 15' x 15' room. Two other employees and one supervisor were also present in the room at the time of observation. The fourth subject was observed lettering advertising signs in the sheltered workshop setting described above.

The fourth group, Inst-Inst, were moderately and mildly retarded individuals residing and working at Parsons State Hospital and Training Center. One female subject was observed in the institution laundry, ironing (by machine) and folding sheets; a male subject was observed while delivering laundered clothes by truck accompanied by his supervisor. Two other male subjects were observed performing "unskilled" work in the institution storeroom.

Each of the subjects in the four groups was observed interacting with only a single supervisor. Several subjects, however, shared and were observed interacting with the same supervisor.

Procedures

Data were collected using an event sampling procedure (Wright, 1960). Two observers stationed themselves as unobtrusively as possible

where a subject and his supervisor could be seen and heard. Both observers simultaneously and independently recorded data, one serving as a reliability check on the other; inter-observer reliability was assessed for each subject. Each subject was observed for 120 consecutive minutes during regular working hours.

The behavioral events recorded were mand interactions initiated by the supervisor and directed at the subject being observed. Mand interactions included: (1) the instigating antecedent event, i.e., the mand provided by the supervisor, (2) the response of the subject-employee to the mand, and (3) the consequences of that response. Mands, responses, and consequences were further divided into categories as shown in Table 1. Data sheets, carried by both observers, reflecting

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Insert Table 1 about here

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the classification in Table 1, permitted the scoring of a three-unit contingency record of each mand interaction immediately following such interaction.

Mands were classified into three categories: Explicit mands, Prompts, and Questions. Explicit mands were instructions, orders, commands, or directions (usually in imperative sentence form) emitted by the supervisor of the subject. Single mands were usually characterized by one imperative sentence or verb phrase containing only a

single verb. Mands containing two or more separate sentences with as many verbs (e.g., "Get in the truck. Take the sack with you.") or one sentence with more than one verb phrase (e.g., "Lift the tailgate and latch it.") were scored as two or more separate mands, according to the number of verb phrases emitted. Mand Prompts were defined as verbal statements or gestures not in the form of commands, instructions, etc., but nonetheless functionally equivalent to explicit mands. For example, the mand Prompt, "There's a big box of nails in that corner," is functionally equivalent, in the same context, to "Get some nails out of the box in that corner." Further, a nonvocal gestural mand Prompt indicating placement of an object, accompanied by the phrase, "Right here," may be functionally equivalent to, "Put the box on the table." Questions, the third mand category, were mands which typically specified verbal behavior on the part of the listener.

Subjects' responses to mands were divided into five categories: Correct Motor, Incorrect Motor, Task Related Verbal, Non-task Related Verbal, and No Response. A Correct Motor response was defined as a nonverbal performance in direct correspondence with the antecedent mand; an Incorrect Motor response was defined as a performance which did not have such correspondence. Task Related Verbal responses were vocal responses judged to be relevant and appropriate to the antecedent mand. Task Related Verbal responses included answering questions

("I've finished it already."), giving reasons for noncompliance ("I don't know where they are.") or questioning ("Can you show me how to do that?"). Non-task Related Verbal responses were defined as verbal behavior having no correspondence with requirements of the antecedent mand. This response category included hostile remarks about the supervisor or the requirements of the manded performance, complaining and whining. The No Response category was characterized by situations in which there was no observable occurrence of responses in any of the above response categories for about 15 seconds following the mand. Situations in which two types of responses occurred to the same mand (e.g., a Correct Motor response and a Task Related Verbal response) were scored as separate responses.

The final unit of the three-unit contingency record was divided into Positive, Negative, or "Neutral" consequences of the subjects' responses. The Positive category included both verbal statements and gestures made by the supervisor and directed at the subject, immediately following the response indicating approval, acceptance, encouragement, and/or praise. Negative consequences were verbal statements and gestures indicating disapproval, discouragement, non-acceptance, and disappointment. "Neutral" consequences were defined as situations when neither Positive nor Negative consequences were observed within 30 seconds following the completion of a response.

Since the major concern of the study was mand interactions involving employee and supervisor, only observable consequences provided by the supervisor were recorded. Consequent conditions resulting from the subjects' own behavior or that of fellow employees following a specific response were not considered.

RESULTS AND DISCUSSION

Inter-observer reliability was assessed separately for each unit (antecedent event, response, consequence) of the three-unit contingency record for each group. Reliability was defined as percent agreement between independent observers and was computed by dividing the total number of agreements by the sum of the agreements and disagreements. Mean percent agreements for each unit and group are presented in Table 2.

Insert Table 2 about here

Tables 3, 4, and 5 present the data in terms of group scores according to unit categories. It should be noted that the emphasis in this preliminary effort was not so much comparative as it was applied. That is to say, the design and observational methodology were clearly more sensitive to within subject differences than differences between the groups. Differences between the N, Com-Com, Inst-Com, and Inst-Inst groups are suggestive but not conclusive largely, but not completely,

due to the small number of subjects in these groups. The findings, therefore, have far more implications for the types of mands, responses to mands, and consequences of those responses which may be the focus of rehabilitative measures than for pinpointing deficiencies in particular populations.

Table 3 presents the number of mands (i.e., Explicit mands, Prompts, and Questions) presented to the four groups by their employers

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Insert Table 3 about here

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during the two hours of observation. It is quite clear that Explicit mands including verbal instructions, directions, and commands requiring an observable behavioral response were the most frequent type of mands provided the four groups. A combined total of only 12 Prompts and 19 Questions were provided over all four groups. Apparently, response evocation via verbal and gestural stimuli, not in the form of Explicit mands, is minimal in the types of vocations settings studied. Questions also were provided infrequently when contrasted with the Explicit mands. It may be that more subtle forms of antecedent verbal behavior, such as the various types of prompts and probes described as "supplementary evocation" by Skinner (1957), are relatively rare when the responses to be evoked are discrete motor responses.

The Inst-Inst group was provided with a markedly greater number of Explicit mands than either one of the other three groups. These data are somewhat consistent with the findings of Marshall, Hegrenes and Goldstein (1973) who found a significantly higher frequency of mands emitted by the mothers of retarded children than by mothers of nonretarded children. Such findings suggest that the verbal behavior of the supervisors in the present study is under control of some of the perceived characteristics of the retarded individuals and the type of situations (institution versus community) in which interactions take place. Supporting such suggestions are studies of verbal interactions in groups involving retarded children and normal adults which indicate that the verbal behavior of adults was affected by the verbal level of the children and the type of situation in which the interactions took place (Siegel, 1963a, 1963b; Siegel and Harkins, 1963). Further, it is very likely that the institution vocational setting provides a rather unique environment where the retarded are spoken to infrequently but when spoken to it is usually in the form of simple Explicit mands (cf., Schlanger, 1954; Spradlin, 1966).

The number and percent of Correct, Incorrect, Task Related Verbal, Non-task Related Verbal, and "No Response" responses to all three categories of mands for the four groups is presented in Table 4. The

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Insert Table 4 about here

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first number in each response category for each group is the actual number of responses emitted by the group; the number in parenthesis indicates the percent of the total responses for that group classified in a particular category. Since the frequency of responses is directly related to the frequency of mands provided to evoke responses, percent scores (and not the actual number) are meaningful when comparisons between groups are made. Within group comparisons, however, are based on the actual number of observations. It should be noted that there is a discrepancy in the total number of mands provided and the total number of responses evoked for all four groups. This discrepancy is due to the fact that more than one response to a single mand was possible, although infrequent. For example, a question such as, "Have you seen the broom?" may elicit a correct response (e.g., bringing supervisor the broom) as well as a Task Related Verbal response such as "Yes, it's in the closet."

Perhaps the most interesting aspect of the response data in Table 4 is the lack of any substantial incorrect responding in any of the groups. Further, only a relatively small percentage of the retarded adolescents' responses were in categories other than Correct or Task Related Verbal. All but one response (or 5.6 percent) emitted by the N group was a Correct response or an appropriate Task Related Verbal response. Only 6.1, 10.2, and 6.1 percent of the responses by the Inst-Inst group were classified in the Incorrect, Non-task

Related Verbal, and No Response categories, respectively. If one considers Task Related Verbal responses as well as Correct Motor responses to mands as appropriate forms of behavior in vocational settings, 94.4 percent of the N group's responses were appropriate while 83.3, 88.9, and 77.6 percent of the responses of the Com-Com, Inst-Com, and Inst-Inst groups, respectively, were appropriate. These results suggest that remedial procedures aimed at elimination of Incorrect Motor responses to mands per se may be misdirected efforts. The remedial approach that is suggested by these results is one which places emphasis on such things as the training of inquiry skills and "conversational" verbal skills as functional alternatives to responses alien to the relevant task and "not responding" altogether.

The number and percent of Positive, Negative, and "Neutral" consequences provided following responses by the four groups are shown in Table 5. Instances when no Positive or Negative consequence was ob-

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Insert Table 5 about here

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servable, i.e., "Neutral" consequences, were the predominant events following responses of all but the Inst-Com group. This finding should not be surprising when one considers the contingencies usually governing performances in work settings. Reinforcement is likely to be largely limited to paychecks provided on a fixed schedule -- other

potential reinforcers such as social priase, recognition, smiles, etc. are typically viewed as extraneous to the formal contingencies governing work performance. The predominance of "Neutral" consequences over Positive consequences also suggest that social reinforcement involving verbal statements of approval, encouragement, and acceptance is provided in an unsystematic, intermittent fashion.

The general pattern of consequences provided the four groups appears to be consistent, with the possible exception of the Inst-Com group. A greater percentage of this groups' responses were followed by Positive consequences than "Neutral" consequences. Further, this group was provided a higher percentage of Positive consequences than any of the other three groups suggesting that retarded individuals working in the community, but still living within an institution, are more likely to be reinforced. One explanation for this may be that adults in the community have lower expectations and thus have established lower performance criterion for individuals they know to be retarded. Reinforcement would thus be more accessible to the Inst-Com group even though their performance may be equivalent to that of another group for whom the community has higher expectations.

In general, this preliminary observational study of mand interactions of employees and supervisors provides some evidence that (a) the great majority of mands provided in vocational settings in the institution and the community are in an explicit form requiring an

observable response, (b) incorrect responding to mands per se is virtually nonexistant in vocational settings, (c) remedial procedures should emphasize the acquisition of a verbal repertoire of several appropriate alternatives to immediate and direct compliance with mands, i.e., correct responding, and (d) consequences provided for responses to mands are predominately unobservable, i.e., neither positive nor negative.

In conclusion, the observational methodology used in the present study which incorporates recording and analysis of responses within the context of naturally occurring events seems to offer a firm base for a more functional approach to the design of rehabilitation programs for specific language deficiencies. That is, it may be best to look at the language of the community to determine what forms of verbal behavior should be taught. Viewed from such a practical standpoint, research methods which, to use Wright's (1960) phrase, "...leave nature and society to their own devices" have a definite role in scientific practice.

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Footnote

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TABLE 1

Classification, Descriptions and Examples of Mand Interaction Units Involving Supervisors and Employees in Vocational Setting

Type of Unit		Description	Example
Mands	Explicit	Verbal instruction, direction, command, or order requiring an observable behavioral response.	Supervisor says, "Clean that table."
	Prompt	Verbal and/or gestural stimulus, not in the form of an Explicit mand but functionally equivalent to an Explicit mand.	Supervisor says, "John, right here!" (Often accompanied by a gesture indicating placement or movement.) Supervisor states, "I need a screwdriver."
	Question	Verbal stimulus, usually in interrogative sentence form, specifying verbal response.	Supervisor asks, "Would you get me the drill?" Supervisor asks, "Do you know where the glue is?"
Responses	Correct Motor	Motor performance in direct accordance with the antecedent mand.	Subject cleans the table (mand was "Clean the table.")
	Incorrect Motor	Motor performance not in direct accordance with the antecedent mand.	Subject mops the floor (mand was "Clean the table.")
	Task Related Verbal	Verbal behavior relevant and appropriate to the antecedent mand, such as answering question, giving reason for noncompliance, or asking a task related question.	Subject asks, "Can you show me how?" Subject says, "I'm not allowed to do that without written orders."
	Non-task Related Verbal	Verbal behavior having no correspondence with the requirements of the antecedent mand such as hostile remarks, sarcasm, complaining, and whining.	Subject says, "I always have to do that." Subject says, "This is stupid and I hate it!"
	No Response	No observable behavioral response following within 15 seconds of the mand.	Subject stares at floor, window or wall, or continues with previous task without acknowledging mand.
Consequences	Positive	Verbal statement and/or gesture indicating acceptance, encouragement, and/or approval of the subject's response.	Supervisor says, "Hey, that's nice." Supervisor gives subject a pat on the shoulder and a smile.
	Negative	Verbal statement and/or gesture indicating nonacceptance, disapproval, disappointment, and/or discouragement.	Supervisor says, "You did that all wrong!" Supervisor frowns and shakes head.
	"Neutral"	No Positive or Negative consequence observed within the 30 second period following the completion of the response.	----------

TABLE 2

Mean Percent and Range[a] of Inter-Observer Reliabilities

by Unit

For N, Com-Com, Inst-Com, and Inst-Inst Groups

Group	Type of Unit		
	Mand	Response	Consequence
N	.97 (.93-1.00)	.97 (.94-1.00)	.95 (.90-1.00)
Com-Com	.99 (.98-1.00)	.97 (.95-1.00)	.98 (.97-1.00)
Inst-Com	.98 (.93-1.00)	.94 (.90-1.00)	.93 (.80-1.00)
Inst-Inst	.92 (.90-.94)	.92 (.90-.94)	.91 (.90-.92)

[a]in parenthesis

TABLE 3

Number of Explict Mands, Prompts, and Questions
Presented to the [illegible], Com-Com, Inst-Com, and Inst-Inst Groups

Groups	Mand Category			
	Explicit	Prompt	Question	Total
N	13	3	1	17
Com-Com	15	0	7	22
Inst-Com	11	4	11	26
Inst-Inst	36	5	0	41
TOTAL	75	12	19	106

TABLE 4

Number and Percent[a] of Correct, Incorrect, Task Related Verbal, Non-Task Related Verbal and "No Response" Responses to Hands for the N, Com-Com, Inst-Com, and Inst-Inst Groups

Groups	Responses					
	Correct	Incorrect	TR Verbal	NTR Verbal	No Response	Total
N	15 (83.3)	1 (5.6)	2 (11.1)	0	0	18
Com-Com	14 (58.3)	0	6 (25.0)	2 (8.3)	2 (8.3)	24
Inst-Com	14 (51.9)	2 (7.4)	10 (37.0)	0	1 (3.7)	27
Inst-Inst	29 (59.2)	3 (6.1)	9 (18.4)	5 (10.2)	3 (6.1)	49
TOTAL	72	6	27	7	6	118

[a] in parenthesis

TABLE 5

Number and Percent[a] of Positive, Negative, and "Neutral" Consequences of Responses for the N, Com-Com, Inst-Com and Inst-Inst Groups

Groups	Consequence Category			
	Positive	Negative	"Neutral"	Total
N	4 (23)	1 (5.8)	12 (70.6)	17
Com-Com	7 (31.8)	3 (13.6)	12 (54.6)	22
Inst-Com	13 (50)	2 (7.7)	11 (42.3)	26
Inst-Inst	6 (15)	7 (17.5)	27 (67.5)	40
TOTAL	30	13	62	105

[a] in parenthesis